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BDR Technologies: Beating the Biodiesel Catch-22

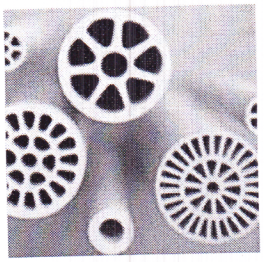
Submitted by Linda on Mon, 06/06/2011 - 13:55

The idea that you could grow your own gasoline (sort of) is just so appealing - freedom from foreign oil, freedom from releasing long-buried carbon into the atmosphere, maybe even remediating or reclaiming some damaged land. What could be greener?

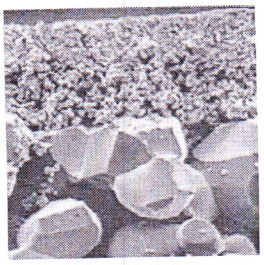
Reality is not so easy of course: between competition with food, the energy costs associated with growing, harvesting, transporting and processing the feedstock, and the equipment and operations costs for making biofuels, it's still (mostly) gasoline-from-drilled-oil that we buy at the pump. But that doesn't mean that there aren't lots of smart people working on a lot of innovative solutions to help us move toward biofuels.

In the case of biodiesel, the Catch-22 has always been the tradeoff between economics and quality. If you want to keep costs down, you need to use an inexpensive feedstock material. But inexpensive feedstock generates a lot of impurities and particulates that cause operational problems during production and performance problems during use. In addition, industry quality standards are increasingly more stringent. So right now your choice is either paying far more than most people are willing to pay for biodiesel to get the good stuff or dealing with the increased processing expense, poor quality and performance issues associated with the lower cost feedstock.

Ceramic Membranes Provide Better Biodiesel at a Lower Cost



Enter BDR Technologies, with a patented processing technology that makes very pure products no matter which feedstock you use, and does it at a lower cost than many of its competitors. In a BDR system, the feedstock, methanol and a catalyst are combined and passed through their special membrane filters. The filters are formed into tubes that provide a lot of surface area for the liquids to pass through, separating the biodiesel (and its glycerin co-product) from unreacted materials and contaminants from the biodiesel. You can see some of their membrane tube designs in the photo at left and their microstructure in cross-section in the micrograph just below it (hey, I'm a materials scientist by training - I get to put in micrographs once in a while!). The result: nice, clean biodiesel and very pure glycerin (for soap, cosmetics, pharmaceutials and other applications).



CEO Ken Lawless told me during our coaching session that they designed from the beginning for retrofit into existing biodiesel processing systems. The bonus for their customers is that the reactors can essentially double the capacity of an existing plant on the same footprint with very short payback periods. I love this approach because he doesn't have to build plants - which could run into the tens of millions. He just needs $250K to insert his reactors into an existing plant to improve its quality and increase capacity, making this technology a much more affordable option. He's planning to commission the demo plant in September 2012, so it's a very exciting time for him and his team.

If you'd like to learn more, I encourage you to attend their pitch by registering for TechConnect World Expo and attending the Consulate General of Canada Boston's all day Canada Innovates clean energy conference, including pitches by 14 Canadian companies with a broad range of technologies.

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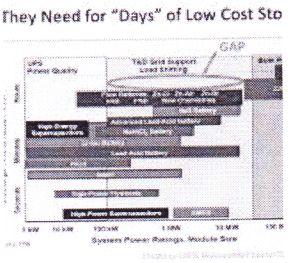
Hydrostor: Grid Scale Energy Storage

Submitted by Linda on Mon, 06/06/2011 - 15:25

Almost no aspect of energy use is untouched by the issue of energy storage. We're most accustomed to dealing with it in our daily lives: at what inconvenient moment is our cell phone or laptop battery going to fail us? But far more important from a clean energy perspective is grid scale storage. Wind and solar farms need cost effective storage to smooth out the inherent ups and downs of energy production from the weather. Utilities can put off building new power plants longer if low cost, convenient storage is available to allow them to manage supply and demand more effectively.



The diagram to the right (from the Electric Power Research Institute; click to enlarge) illustrates an important gap in storage solutions: the ability to store energy to be delivered over a period of hours to days at hundreds of kilowatts to hundreds of megawatts, the kind of energy supply that can keep substantial communities powered over time when the generated supply isn't adequate.

Novel Approach to Compressed Air Energy Storage

Hydrostor, a Canadian startup, will be pitching their solution for that gap at the Canada Pavilion at the TechConnect World Expo Boston on June 15. Hydrostor has an intriguing twist on Compressed Air Energy Storage (CAES) and I really like the way they think: they've taken the very practical approach of applying existing technology in a novel way. The air is stored in very large surplus military bags under water. These bags have been used in marine environments for decades without significant environmental impact and they're inexpensive.

But wait, you may be thinking, how many people live close enough to water deep enough to use these bags for it to be worthwhile? I asked the same question when I was coaching CEO Curt VanWalleghem and was surprised to learn that close to 50% of the world's population actually lives in a geography that is well-suited to Hydrostor's technology. In fact, they're building their pilot project with Toronto Hydro. They've further tuned their business model to target off-grid, remote populations such as island nations.

If you'd like to learn more, I encourage you to attend their pitch by registering for TechConnect World Expo and attending the Consulate General of Canada Boston's all day Canada Innovates clean energy conference, including pitches by 14 Canadian companies with a broad range of technologies.

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